SYNOPSIS OF CRUSTACEAN RESOURCES IN MASSACHUSETTS WATERS

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Crustaceans

- 29 genera, ~40 species.
- Lobsters, crabs, shrimps, hermit crabs, mud shrimps, mantis shrimps.
- Known for their chitinous shells—must be shed in order to grow (molting).
- Two pairs of antennae
- Compound eyes
- Decapod Crustaceans have 5 pairs of walking legs

- Habitat, Temperature, Currents, Salinity, Dissolved Oxygen, Bottom Sediments are all important to the ecology of most crustaceans.

  ----In general, oceanographic factors such as water temperature and currents are important for growth, reproduction, egg development and the dispersal of larvae and post-larvae, whereas…

  ----Bottom substrate characteristics and depth affect juvenile and adult distribution and abundance.

American lobster (*Homarus americanus*)

- Distribution: Labrador to North Carolina; from mean low water to depths of 700 m. Lobsters are most abundant in relatively shallow coastal zones.
- Occur throughout MA waters; most abundant north of Cape Cod.

Life History:

- A long-lived species known historically to reach more than 40 lbs.
- Average size landed in inshore fishery today is 1 ¼ lbs.
- Mate within 24 hours after female molts and is soft.
- Following year she extrudes from 5,000 to >100,000 eggs, depending upon body size.
- Eggs are attached to the underside of the tail.

- Eggs are carried for 9-12 months before hatching.
- Larvae develop at sea during a 2 to 6 week period.
- After 4 molts (4th stage) postlarvae settle to the bottom and seek shelter.
- During first several years they are cryptic.
- They move little during first year, often found within a meter of settlement.

- Daily and annual range of movement increases with growth.

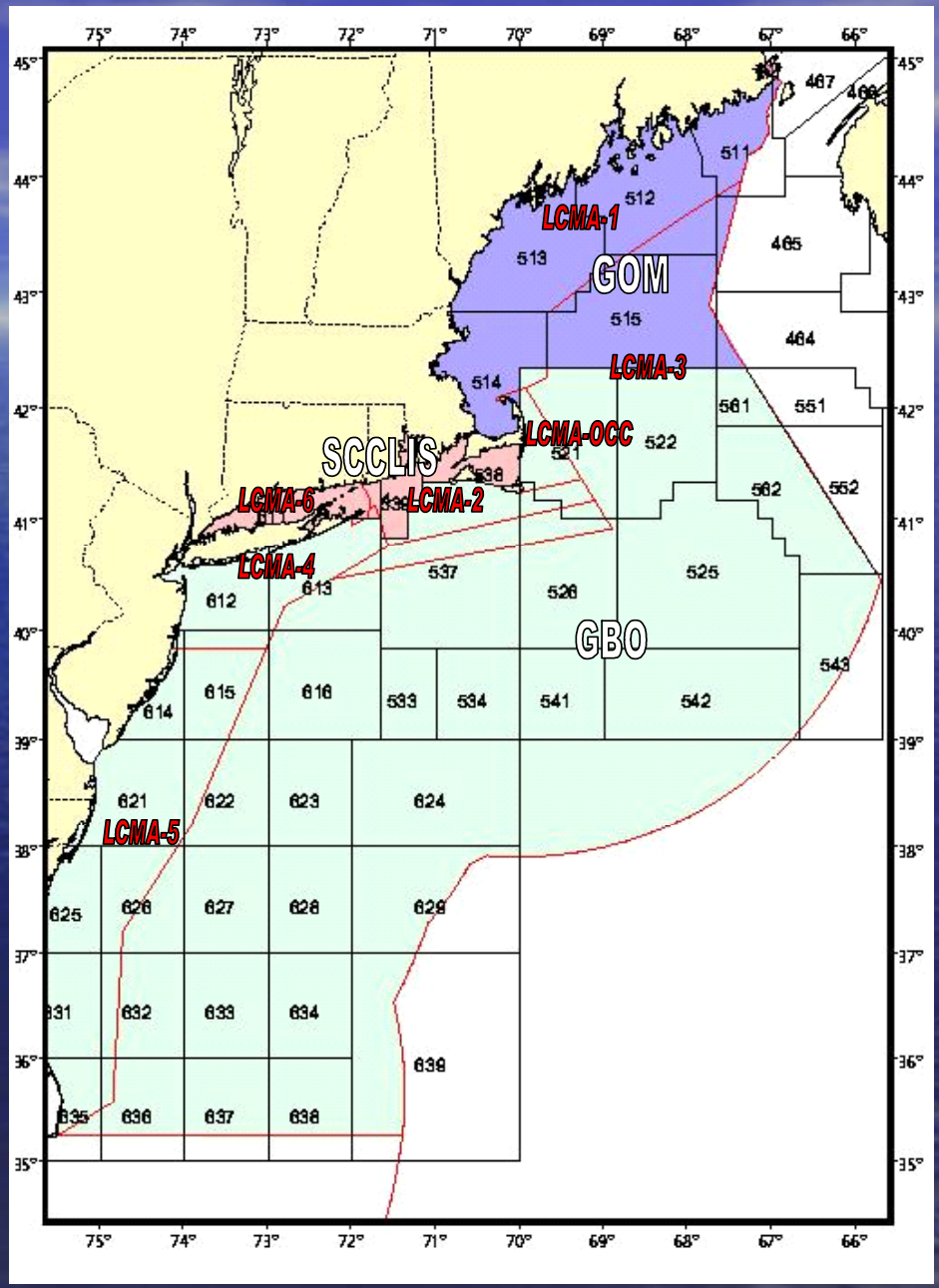
Commercial Information:

- Most economically important single-species fishery in MA inshore waters. In 2001, 12.2 million pounds landed with a value of $45.5 million.

Status:

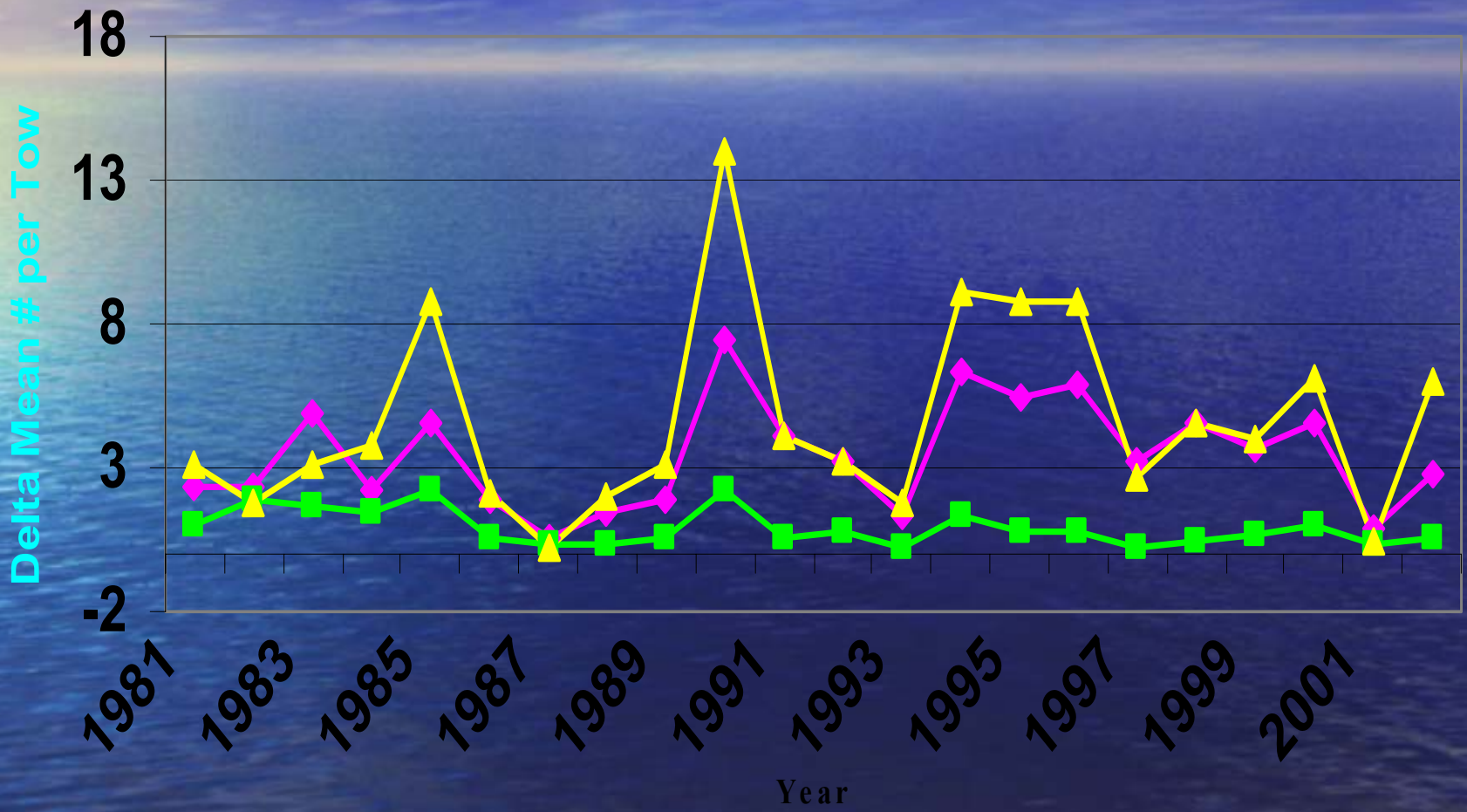
- Last last stock assessment conclusion:

  overfishing occurring in all three stock units



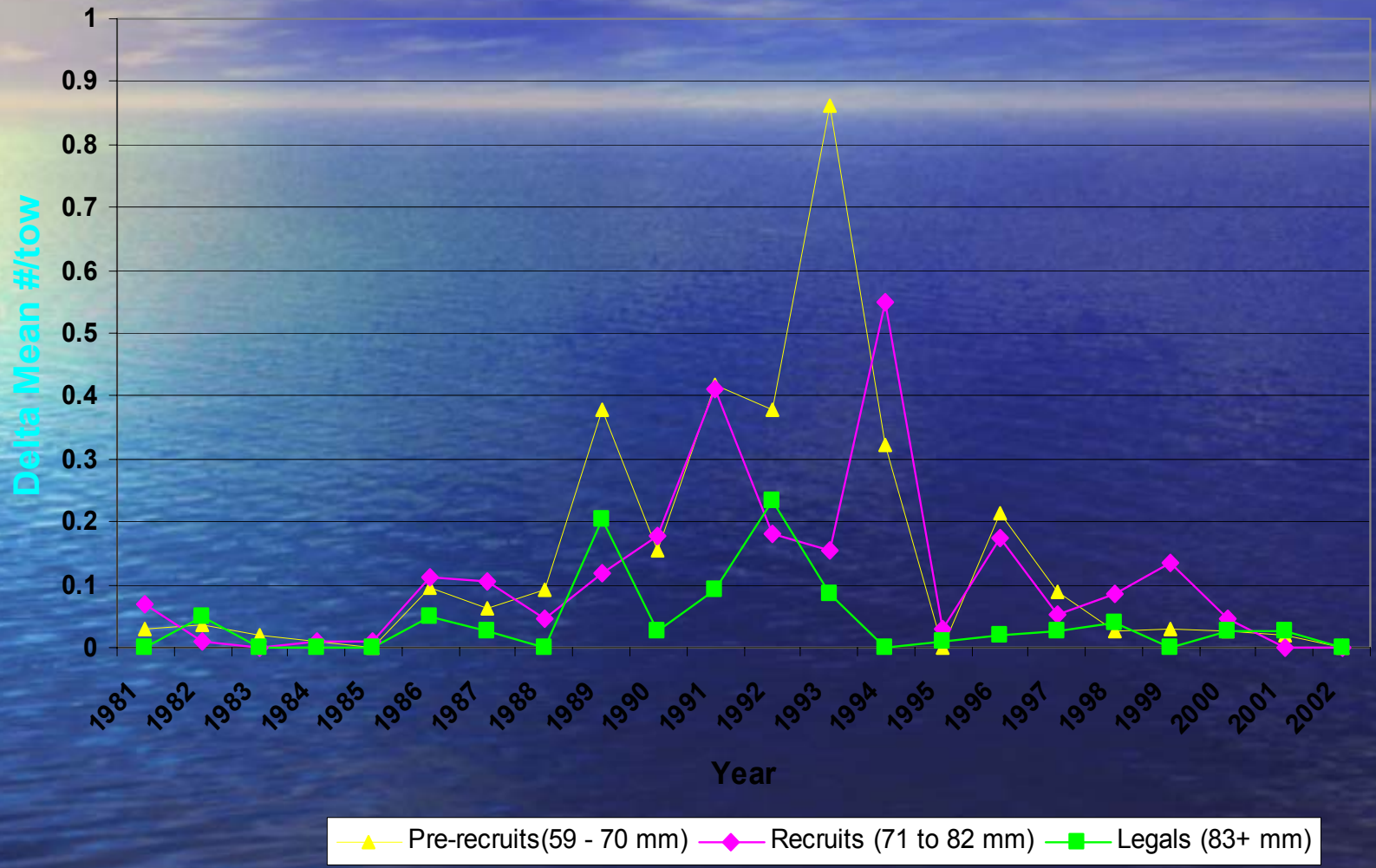
MADMF Fall Trawl Survey - North of Cape Cod

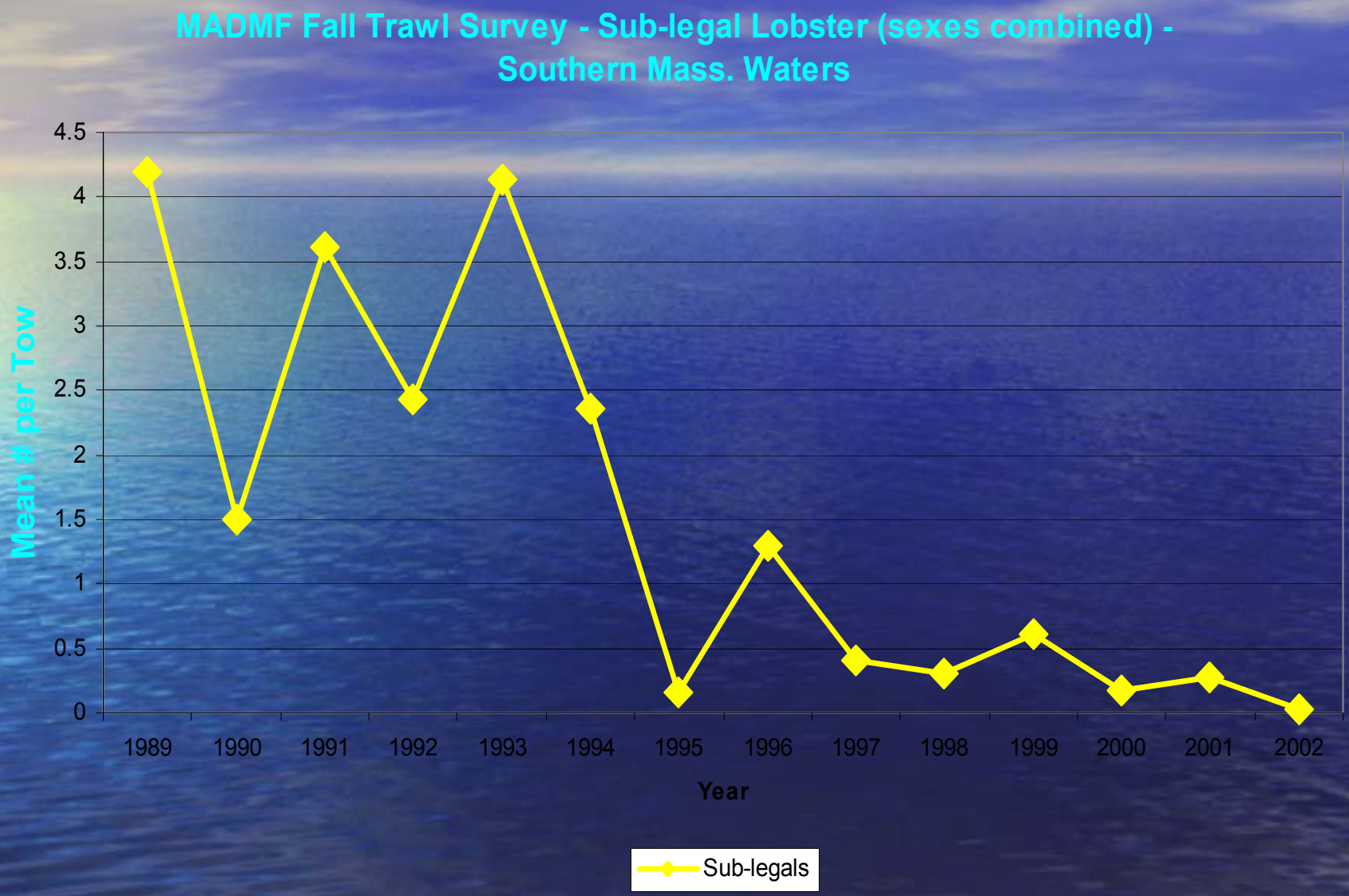
FEMALE LOBSTERS



MADMF Fall Trawl Survey - Southern Mass. Waters

FEMALE LOBSTERS




MADMF Fall Trawl Survey - Sub-legal Lobster (sexes combined) - Southern Mass. Waters
Mean # per Tow
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
Year
Sub-legals

Management Issues:

- The American lobster fishery is currently managed under the Atlantic States Marine Fisheries Commission's Amendment #3 to the Interstate Fishery Management Plan for American Lobsters
- The basic thrust:

  1) to prevent escalation of fishing effort, **2)** increase egg production so as to exceed 10% of the maximum spawning potential.
- Amendment #3 established seven lobster management areas—Unenviably--MA borders on three of them.
- Currently three diff. min. legal sizes in MA (N, S, and E).

Threats: Anthropogenic

- Recruitment–Dependent Fishery (Most lobsters caught have recently molted into the legal size range). No buffer against a recruitment short-fall. Growing dependence on younger/smaller females for egg production.
- High removal rates in commercial fishery--increasing steadily over the last 10-12 years.
- A five fold increase in total traps has been observed in the Massachusetts fishery since 1960.
- Potential for increased fishing effort within current 800 trap limit
- Pollution concern in nearshore environment.

Threats: Diseases

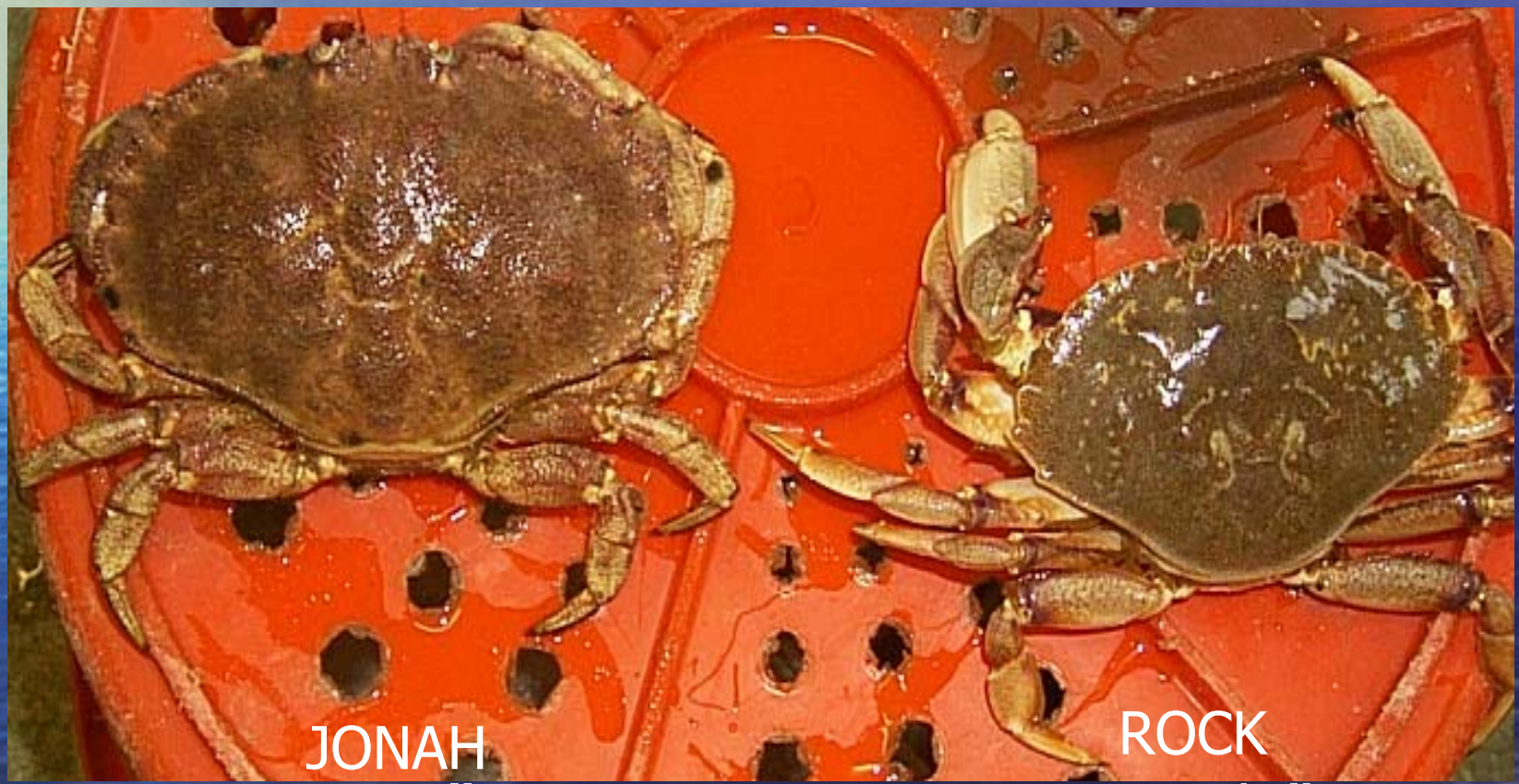
Disease

----Gaffkemia

----Ciliated Protozon

----Chitinoclasia (Shell disease)

Cancer Crabs:
Rock Crab (*Cancer irroratus*)
Jonah Crab (*Cancer borealis*)



- Max size 6 ¾” CW
- Max size 5 1/8" CW

- Distribution: Nova Scotia to South Atlantic States
- Life History: In both species male is considerably larger than the female.
- ROCK CRABS: Prefer rocky habitat but can be displaced onto sand habitat by shelter-space competition with Jonah Crabs and lobster.
- Abundance at or below 24 year median in recent years.

- JONAH CRABS: prefer exposed locations on rocky coasts but are also common on mud bottom in deeper waters
- Inshore--Similar in size to rock crabs --1/3 to 1/2 lb.
- Offshore--males average 1 pound --can attain 2 pounds
- Abundance stable in recent years

Commercial Information:

- Tasty meat—Currently a by-catch fishery. Whole live crab market at local fish retail stores.
- Consumer demand is modest

Management Issues:

- Massachusetts DMF prohibits the landing of edible crabs (any crab other than green crab) from December 1 to March 31st, which encompasses the rock crab's molting period.
- No license required if not using traps and limit is 50 crabs for home consumption.
- If traps are used one must possess a recreational (cannot sell catch) or commercial lobster license (allows selling) and adhere to lobster regulations as well.

Threats:

- Concerns about growth rate
- May not hold up to a directed fishery

Spider Crabs (*Libinia sp.* : *emarginata and dubia*)

Common Spider Crab (*Libinia emarginata)*

- Distribution: Nova Scotia to Florida and Texas.
- Life History: 3 3/4" wide, 4" long. Midline with 9 spines in a row. Hairy shell and legs.
- Various habitats; from low-tide line to water >400' deep. Abundant on mud flats.

Doubtful Spider Crab (*L. dubia*)

- Lives a similar life in comparable habitat, and ranges from Cape Cod to Florida, Texas, the Bahamas and Cuba.
- It differs in having a longer beak with 6 spines down the shell midline.

- Slow-walking scavengers, and not particularly aggressive in general, the spider crab's main defense against predators is camouflage: the hook-like hairs on the crab's shell (carapace) hold algae and other small debris in place.
- The eggs are carried by the females on the legs.
- Not commercially important.
- Abundance north and south of Cape Cod has been stable.
- Currently no management objectives.

Blue Crab (*Callinectes sapidus*)

- Natural range is the western Atlantic Ocean from Nova Scotia to Argentina.
- It has also been successfully introduced, into both Asia and Europe.
- Cape Cod estuaries at northern extent of range.

Life History:

- Active swimmer-paddle-like legs.
- Egg extrusion May-October—eggs attached for 2 weeks before hatching.
- Eggs hatch near mouth of estuaries and most larval development takes place in higher salinities of outer coastal waters for 1 to 3 months before returning to estuaries on currents to settle out inshore.

- Growth is rapid
- Most crabs reach sexual maturity within 18 months
- Males can reach 10 inches CW

Commercial Information:

- Blue crabs represent an important fishery in states south of Massachusetts; e.g. Maryland.
- Not abundant enough in Massachusetts to support a commercial fishery.
- Popular recreational fishery in southern MA estuaries.

Status and Trends:

- Blue crabs have been relatively stable in abundance over long term.
- Although….can exhibit seasonal abundance cycles and considerable variation in peak abundance annually.

Management Issues:

- Edible Crab closed season applies from December 1 to March 31st .
- No license is necessary if crabs are caught without traps and limit is 50 crabs for home consumption only.
- Minimum Size. 4 1/8 CW.
- No egg-bearing crabs allowed.

Lady Crab (*Ovalipes ocellatus*)

- Distribution: Cape Cod to South Carolina. Isolated population on Prince Edward Island.
- 3 1/8" wide, 2 1/2" long; 5th pair of walking legs paddlelike.
- Habitat On sand, rock, or mud bottoms; from low-tide line to water 130' deep.
- Abundant in Cape Cod estuaries.
- Known for its aggressive disposition and sharp pincers. It must be handled with great caution.
- No Commercial Importance
- No Management Objectives

Green Crab (*Carcinus maenus*)

- Distribution: Native to northern European coastal waters…appeared on the North American East coast in 1800's where it was found from Nova Scotia to Maryland.
- In 1900's it spread to both coasts of North America, South Africa, Japan, and Australia. It adapts well and tolerates a broad environmental range.
- Classic invader…

- Grow to 3 inches CW
- Despite name: color variable/dark, mottled, often green or orange.

Life History:

- High reproductive rate; high dispersal potential; rapid growth rate. Tolerates an extremely broad habitat, temperature, and salinity range.
- Has broad diet.
- Larvae have an 80-day planktonic phase. Final larval stage aggregates at night in surface waters and tides and currents deliver back to coastal waters….settle out in intertidal zone as juveniles.

Commercial Information:

- Meat is edible, but not plentiful so little commercial value in this respect.
- Species does have value as a bait species for sport fisheries such as tautog.
- Can have a negative impact on other species.
- Important predator on soft-shelled clams and other bivalves---has wreaked havoc in the shellfish industry.

Status and Trends:

- Abundant throughout inshore waters of Massachusetts but can be found primarily in estuarine environments

Management Information:

- (Ch. 130, Section 37A, MGL)…Any person may take green crabs, provided that:
- 1) written notice given to the (MADMF) director,
- 2) all traps, gear and buoys are marked, as required, in a uniform manner
- 3) an annual report is filed with the director noting the approximate number of bushels taken each month of the year and whether such crabs were destroyed or used for bait purposes in the commonwealth.

Management Issues:

- Green crab is an invasive species which threatens abundance of other invertebrates.
- There are currently no management objectives except that municipalities have had eradication programs in the past and some still do.
- At present, no mandatory laws governing ballast water exchange at sea—voluntary outside of Great Lakes, but rules may be forthcoming which make the reporting of ballast water management practices mandatory.

Mud Crabs (*Xanthidae, Panopoedae*)

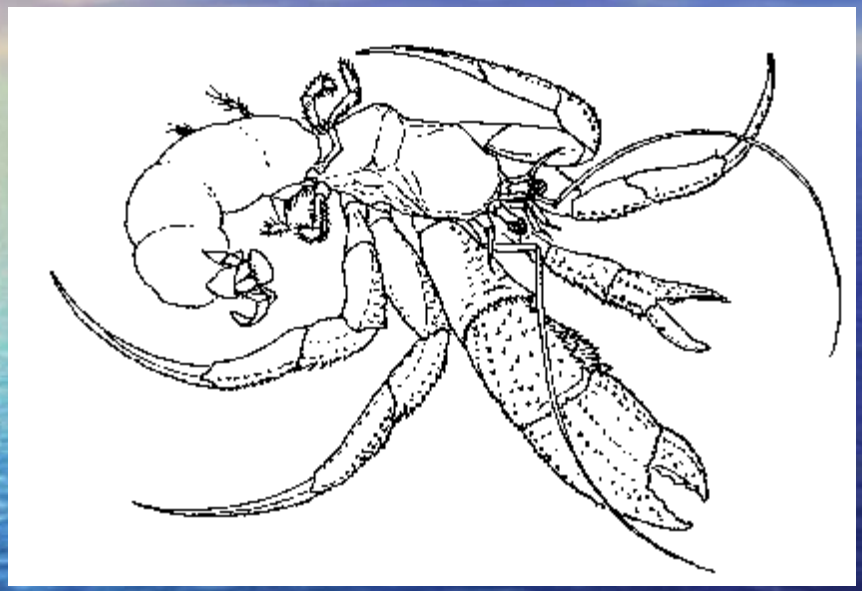
- Small crabs ~ 1 inch CW.

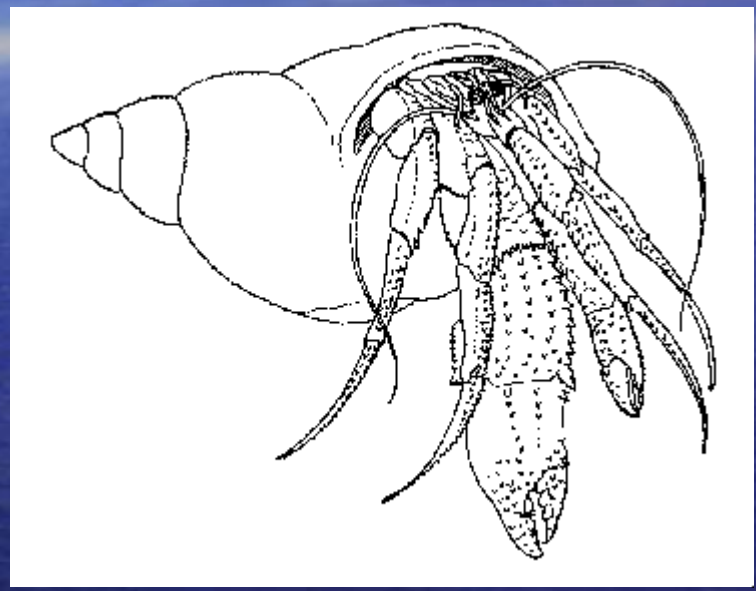
- Most abundant south of Cape Cod
- Mud crabs are common in soft bottom vegetated, cobbly, or oyster bed areas of coastal waters along the temperate and tropical coastlines of America.
- Feed on numerous invertebrate species and can have a role in effecting community structure.
- Biology of most species is poorly known …..Similar morphology among species has made taxonomy difficult.
- No commercial value
- Currently no management objectives

Fiddler Crabs (*Uca pugilator*)

- 1 to 1 ½" CW.
- Abundant in intertidal mud flats
- Popular bait species
- Currently no management objectives

Hermit Crabs (*Pagurus sp.*)





- It protects its abdomen, which contains important organs such as the liver and the gonads, by inserting it into a gastropod shell.

- Abundant north and south of Cape Cod
- No commercial importance
- No current management objectives

Japanese Shore Crab (*Hemigrapsus sanguineus*)

- Another bio-invader. This crab was first reported near Cape May, New Jersey in 1988, where it was probably introduced via ballast water.
- Now occurs over a good portion of the east coast. Found north and south of Cape Cod.
- Adult crabs can reach over 1 1/2 inches in CW.

- ID: three spines on each side of the carapace.
- Mottled; Legs have a distinct banding pattern.

- It typically lives in the intertidal or shallow subtidal zone, where water depth is only a couple of feet at low tide. Found subtidally also.
- Can often be found under rocks in the intertidal zone during low tide.
- Competes for food and habitat space. Appears to occupy habitats very similar to crabs that are native to the region.
- Eats a varied diet including algae and invertebrates, juvenile clams. It also may act as a food source for larger animals.

Ghost Shrimp (*Callianassa, Upogebia, Naushonia sp.*)

- Adults reach 3 to 4 inches long

- Can be found north and south of Cape Cod, but more abundant southward
- Burrows in sand and mud in intertidal and subtidal areas
- Can be found under rocks
- Scavenger…feeds on detritus
- No commercial value here
- No management objectives

Sand Shrimp (*Crangon septemspinosa*)

- 2 ¾ " long
- Lives on sandy bottoms and in eelgrass beds in bays and estuaries from low tide to 300 ft.
- High salinity tolerance
- Ranges from Arctic to Florida

Mantis Shrimp (*Squilla empusa*)

- Occurs primarily south of Cape Cod

- 10" (25 cm) long, 2 1/2" (64 mm) wide. Shrimplike, somewhat flattened.
- Often called a "thumb chopper". A quick slash of one of its large appendages can cut a shrimp or fish in two - or lacerate a finger.

- Life History: This small crustacean is noted for its formidable claws.
- Burrows in sand or mud; from low-tide line to water 500' (152 m) deep.
- A nocturnal carnivore … feeds mainly on soft bodied animals like fish, shrimps, krill, worms, snails, crabs, hermits, other mantis shrimp.
- The eggs are developed and carried by the anterior legs, making it look as if the mother was eating her babies.

- **<u>Commercial Information</u>:** Not plentiful enough for a commercial fishery in Massachusetts.
- Edible and its abdomen is often prized for its taste.
- No current management objectives